

## REMARKS

This application has been reviewed in light of the Office Action dated March 17, 2004. Claims 7-15 are pending. Claim 15 has been amended. Claims 7 and 11 are in independent form. Favorable reconsideration is requested.

Claims 7-10 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,412,224 (*Sugitani*) and Claims 11-15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Sugitani* in view of U.S. Patent No. 4,722,824 (*Wiech, Jr.*). Applicants respectfully traverse these rejections.

Applicants submit that independent Claims 7 and 11, together with the remaining claims dependent thereon, are patentably distinct from the cited prior art at least for the following reasons.

Claim 7 recites, *inter alia*, a step of providing a plurality of recessed portions in a surface on the substrate such that the plurality of recessed portions have a bottom surface located at a position which is lower than a position of a heat acting surface of the substrate, and a step of fitting the plurality of recessed portions to flow passage walls of a ceiling member by applying a force to the ceiling member along a direction in which a plurality of energy generating elements are arranged, thereby aligning the flow passages with the energy generating elements.

Fig. 6 illustrates an example of the plurality of recesses having a bottom surface located at a position which is lower than a position of a heat acting surface of the substrate. Specifically, Fig. 6 shows that the bottom surface of a recess (contact surface 1119 of the heater board and the lower end portion of the flow passage wall) is lower than heat acting surface 1116 (see also page 33, lines 1-3, of the specification).

*Sugitani* relates to a method of forming an ink-jet head. According to the method (see Figs. 3-8 and accompanying text), a dry film photoresist 5 is laminated onto substrate 1 and exposed through photomask 6. “It is necessary that the position of the [mask] pattern and the position of the pressure generating element should be aligned by a conventional method” (col. 2, lines 50-53). The exposed portion of film 5 is dissolved, leaving resist pattern 5P. Then the portions of the substrate other than pattern 5P are electrically plated with nickel or copper, forming an electroplated layer 7, which constitutes the flow passage walls. Subsequently, pattern 5P is removed, and ceiling plate 9 is attached by adhesion or press fitting.

The Office Action (page 2) cites *Sugitani* as teaching “providing a plurality of recessed portions (recessed areas of dielectric thin film 3 on either side of heating elements 2 in Fig. 1) in a surface on a substrate 1 such that the recessed portions have a bottom surface located at a position that is lower than a position of a heat acting surface (top surface areas of dielectric thin film 3 directly above heating elements 2 in Fig. 1).”

However, according to Applicants’ understanding, the bottom surface of the recess portion in *Sugitani* would be the top surface of element 4, i.e., the surface which the bottom of the flow passage walls contact. As explained above, according to the instant application, the bottom surface of the recess portion is the surface which the bottom of the flow passage walls contact. As shown in the figures of *Sugitani* discussed above, the top surface of element 4 is not lower than the heat acting surface (top surface areas of dielectric thin film 3).

Further, the Office Action (page 2) cites *Sugitani* as teaching “fitting the recessed portions to flow passage walls 7 of a ceiling member 9 by applying a force to the ceiling member

along a direction in which the energy generating elements 2 are arranged, thereby aligning the flow passages 7 with the energy generating elements (see Fig. 8 and col. 3, lines 15+).”

However, as shown in *Sugitani*’s Figs. 5-8, flow passage walls 7 are fully formed on substrate 1 and fully aligned relative to heaters 2 before ceiling plate 9 is put on. The cited portion of *Sugitani* states only that, after walls 7 are completed, ceiling plate 9 is attached by adhesion or press fitting.

In this regard, the Office Action (page 4) states that

the assembly of the recessed portions . . . are fitted to the flow passage walls 7 of the ceiling member 9 by applying an inherent applied force to the ceiling member (see sequence of Figs. 7-8) along at least a direction in which the energy generating elements 2 are arranged in alignment with the flow passages. This alignment of the flow passages being directly above the energy generating elements is what is considered to be the final resulting structure shown in Figure 8. This inherent force applied by the ceiling member 9 to the flow passage walls 7 is what serves to both align and fit the flow passage walls 7 to the recessed portions. . . , otherwise the ink jet head of *Sugitani* would not even work or function.

However, Applicants submit that, even if a force is inherently applied to *Sugitani*’s ceiling member to apply it to the flow passage walls, nothing in Figs. 7-8 or in the text of *Sugitani* is seen to suggest that the force serves to fit or align the flow passages with energy generating elements. Rather, as explained above, in *Sugitani* the alignment of the walls with the pressure generating elements is performed by aligning the mask pattern and the pressure generating elements. Then the walls are formed at the positions where the exposure through the mask took place. As shown in the figures, the walls are fully aligned and fitted before application of the ceiling plate.

Further, Applicants submit that nothing in *Sugitani* is seen to suggest that such inherent force of applying the ceiling plate would be applied along a direction in which a

plurality of energy generating elements are arranged. Rather, Applicants understand that such inherent force would be applied in a direction pressing down on walls 7, which is not a direction in which a plurality of energy generating elements are arranged. As Applicants can find nothing in the Office Action citing any portion of *Sugitani* as allegedly teaching this limitation of Claim 7, Applicants respectfully request that the Examiner point out such portion of *Sugitani* and explain how this limitation is allegedly taught, should the Examiner maintain this rejection.

Further, the Office Action states that

with respect to Claims 7 and 11, only two steps of ‘providing...’ and ‘fitting...’ are required and any interconnection as to when the claimed ‘ceiling member’ is fitted is not recited in the claims. In other words, the claimed ‘ceiling member’ recited in the preamble of each claim does not further limit the body of the claims as to what order the ceiling member must be bonded in relationship to when the flow passage walls are bonded.

However, Claims 7 and 11 recite that the recessed portions are fitted into the flow passage walls, and the flow passages are aligned, by applying a force to a ceiling member. The word “by” indicates that the application of the force to the ceiling member causes the fitting of the recess portions to the walls and the aligning of the passages. Since the application of the force causes the fitting and the aligning, the fitting and the aligning cannot occur before the application of the force. Thus, notwithstanding that the claims do not recite temporal restrictions on the application of the force to the ceiling member in so many words, the recitations of the claims nonetheless logically imply temporal constraints on the application of the force to the ceiling member. *Sugitani* does not meet those temporal constraints, that is, in *Sugitani* the fitting of the recess portions to the walls and the aligning of the passages occur before the application of the force to the ceiling member. (Therefore, in *Sugitani*, the application of the force cannot cause

the fitting and the aligning, and it cannot be said that *Sugitani* teaches that the fitting and aligning are performed by the application of the force.)

Since *Sugitani* does not contain all of the elements of Claim 7, that claim is believed allowable over the cited art. Accordingly, Applicants submit that, at least for the reasons discussed above, Claim 7 is patentable over *Sugitani*.

Claim 11 recites, *inter alia*, the “providing” step recited in Claim 7. The deficiencies of *Sugitani* with regard to this step have been discussed above with regard to Claim 7.

*Wiech, Jr.* relates to a method of joining green bodies prior to sintering. Even if this reference be deemed to teach vibrating the substrate, as alleged by the Office Action, Applicants submit that nothing in *Wiech, Jr.* that would remedy the noted deficiencies of *Sugitani* with regard to Claim 11.

Since neither *Sugitani* nor *Wiech, Jr.*, whether taken singly or in combination (even assuming, for the sake of argument, that such combination were permissible), contains all of the elements of Claim 11, that claim is believed allowable over the cited art.

A review of the other art of record has failed to reveal anything which, in Applicants’ opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the


invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

Applicants submit that this Amendment After Final Rejection clearly places the subject application in condition for allowance. This Amendment was not presented earlier, because Applicants believed that the prior Amendment placed the subject application in condition for allowance. Accordingly, entry of the instant Amendment, as an earnest attempt to advance prosecution and reduce the number of issues, is requested under 37 C.F.R. § 1.116.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

  
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